REMARKS/ARGUMENTS

1. Rejection of claim 3-7, 9 and 11-13 under 35 U.S.C. 103

Claims 3 and 6 were rejected as being obvious over Ying et al. in view of Moise et al. Withdrawal of the rejection is respectfully requested for at least the following reasons.

i. There must be some suggestion or motivation to combine Ying et al. and Moise et al.

As discussed in MPER 2143.01, in order for a combination of references to be appropriate, there must be some suggestion or motivation, either in the references themselves or in the general knowledge of one of ordinary skill in the art, to modify or combine the reference teachings. As set forth in more detail below, the applicants believe than an adequate showing has not been made. Accordingly, if the 103 rejection is maintained in a subsequent office action, Applicants request a showing of such a suggestion or motivation.

ii. Ying et al. and Moise et al. each teach a three step plasma etch process for etching a ferroelectric capacitor. As set forth below, however, the three-step process in each reference is carried out at a temperature that categorically excludes a combination with the other reference. Thus, the proposed modification of Yang et al. in view of Moise et al. would render the prior art unsatisfactory for its intended purpose, and therefore one of ordinary skill in the art would not be motivated to combine the references.

If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation

to make the proposed modification. In re Gordon, 733 F.2d 900, 221 USPQ 1125 (fed. Cir. 1984). See also MPEP 2145. it is improper to combine references where references teach away from their combination. In re Grasselli, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983) (emphasis added).

In order to manufacture a ferroelectric capacitor, Ying discusses a three step plasma process in paragraphs [0028]-[0031]. Specifically, Ying discloses etching top electrode layers 250, 255 in paragraph [0029]; etching PZT layer 240 in paragraph [0030]; and etching bottom electrode layers 230, 235 in paragraph [0031]. Ying discloses that during the plasma etch process, '**substrate 210 [is heated] to a temperature above between 250°C and 450°C, and [preferably to a temperature above between about 250°C and 450°C, and preferably to a temperature of about 350°C.**" [0028] (emphasis added).

Moise generally discusses its three step plasma process on col. 9, line 55-col. 10, line 38. Specifically, Moise teaches that "**[these] steps are all carried out at relatively low temperatures (e.g., less than 200°C.)**" col. 10, lines 33-34 (emphasis added).

Therefore a person of ordinary skill in the art would be unsuccessful if he or she tried to combine the processes of Ying and Moise because the temperatures at which the processes are carried out differ significantly. In other words, Ying and Moise expressly teach away from their combination. Not only are the temperature ranges different (with no over lap between the ranges), but Ying expressly provides that a "hot chuck heats the substrate" while Moise is carried out "with backside wafer cooling." (Ying [0028] and Moise [col. 10, lines 34-35], respectively).

Therefore the proposed modification set forth in the prior office actions would render the prier art unsatisfactory for its intended purpose and the combination of references is improper. Accordingly, withdrawal of the obviousness rejection is respectfully requested.

iii. **Ying et al. and Moise et al. do not teach a PZT etch with BCL3 and Cl2 in a range of ratios from 1:4 to 10:1, particularly when such etch is carried out at temperatures between 200°C and 500°C, as recited in claim 7. Because Moise et al. teaches away from such as etch, claim 7 is non obvious in view of the prior art.**

"A prima facie case of obviousness may also be rebutted by showing that the art, in any materials aspect, teaches away from the claimed invention." MPEP 2144.05 (citing In re Geisler, 116 F.3d 1465, 1471 (Fed. Cir. 1997)).

Claim 7 of the present invention recites that '**all etch [processes are performed t temperatures between 200°C and 500°C**." As discussed above, Moise expressly teaches away from carrying out such an etch process. Moise, col. 10, lines 33-34 (stating "**[these] steps are all carried out a relatively low temperatures (e.g., less than 200°C**.)"

Thus, even if Ying and Moise are combinable (which they are not based on the previous arguments), Moise expressly teaches away from the claimed invention of claim 7. Therefore, claim 7 is nonobvious in view of Yang and Moise and Applicants request a notice of allowance of the same

iv. **Ying et al. and Moise et al. do not teach a PZT etch with BCL2 and Cl2 in a range of ratios from 1:4 to 10:1, respectively, as recited in claims 3 and 6, and it would not be obvious to obtain such ratios by routine experimentation because the recited ratio range is not a result-effective variable.**

As admitted in the Office Action, neither Ying et al. nor Moise et al. teach the gas ratios of BCl3 and Cl2 from 1:4 to 10:1 as claimed. A results-effective variable has been defined as 'a variable which achieves a recognized result." MPEP 2144.05. In the present instance, **Ying et al. do not provide any mention of BCl3 and Cl2 for etching the ferroelectric dielectric layer**. Thus

Ying et al. does not achieve a recognized result as it relates to claim 3 and 6. Further, Moise et al. provides no hint that a ratio range may impact the sidewall profile of the capacitor stack. Therefore, Moise does not achieve a recognized result as it relates to claim 3 and 6.

Therefore, claim 3 and 6, and the dependent claims associated therewith, respectively, are non-obvious over the cited art. Accordingly, withdrawal of the130 rejection is respectfully requested.

In light of the above, it is respectfully submitted that the present application is in condition for allowance, and notice to that effect is respectfully requested.

While it is believed that the instant response places the application in condition for allowance, should the Examiner have any further comments or suggestions, it is respectfully requested that the Examiner contact the undersigned in order to expeditiously resolve any outstanding issues.

To the extent necessary, Applicants petition for an Extension of Time under 37 CFR 1.136. Please charge any fees in connection with the filing of this paper, including extension of time fees, to the deposit account of Texas Instruments Incorporated, Account No. 20-0668.

Respectfully submitted,

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